THAT WHICH IS CLAIMED IS:

1. A method of processing a telecommunication signal on a telecommunications network, comprising the steps of:

receiving a synchronous telecommunication signal containing multiplexed, asynchronous payload signals each having a data rate;

extracting the asynchronous payload signals from the synchronous telecommunication signal;

sequentially framing the asynchronous payload signals with a corresponding clock pulse and framing pulse;

synchronizing the sequentially framed asynchronous payload signals together at a data rate higher than that of the asynchronous payload data rate;

processing the synchronized payload signals with a signal processing algorithm;

restoring the processed payload signals to their asynchronous relationships, whereby processed asynchronous payload signals are provided;

multiplexing the restored asynchronous payload signals into a second telecommunication signal; and

transmitting the second telecommunication signal to a destination.

2. The method of Claim 1 wherein the step of synchronizing the payload signals comprises the step of multiplexing the asynchronous payload signals.

3. The method of Claim 1 comprising the step of generating stuff-bit frames for combining with said asynchronous payload signal frames.

4. The method of Claim 3 wherein the step of synchronizing the payload signals comprises the steps of

combining asynchronous payload signal frames and stuff bit frames to form synchronous payload signals; and

generating a master frame pulse signal.

5. The method of Claim 2 wherein the step of processing the synchronous payload signals comprises the steps of

demultiplexing the synchronous payload signals; and

separating the asynchronous payload signal frames from the stuff-bit frames.

6. The method of Claim 1 wherein the processing algorithm is selected from the group consisting of data compression algorithms, echo cancellation algorithms, error correction coding algorithms, voice encryption/decryption algorithms, data encryption/decryption algorithms, and combinations thereof.

7. A method of processing a telecommunication signal on a telecommunications network, comprising the steps of:

receiving a synchronous telecommunication signal containing multiplexed, asynchronous payload signals each having a data rate;

extracting the asynchronous payload signals from the synchronous telecommunication signal;

sequentially framing the asynchronous payload signals with a corresponding clock pulse and framing pulse;

synchronizing the sequentially framed asynchronous payload signals together at a data rate higher than that of the asynchronous payload data rate;

generating stuffed payload signals identified by random stuff patterns for the

identification of the stuffed payload signals among the synchronized payload frame groups;

distinguishing stuff payload signals from payload signals by the random stuff patterns through a finite state machine configured in a memory device, the memory device storing state transition tables;

processing the synchronized payload signals identified by the finite state machine with a signal processing algorithm;

restoring the processed payload signals to their asynchronous relationships, whereby processed asynchronous payload signals are provided;

multiplexing the restored asynchronous payload signals into a second telecommunication signal; and

transmitting the second telecommunication signal to a destination.

8. The method of Claim 7 wherein the finite state machine memory is random access memory.

9. A method of processing a telecommunication signal on a telecommunications network, comprising the steps of:

receiving a synchronous telecommunication signal containing multiplexed, asynchronous payload signals each having a data rate;

extracting the asynchronous payload signals from the synchronous telecommunication signal;

sequentially framing the asynchronous payload signals with a corresponding clock pulse and framing pulse;

synchronizing the sequentially framed asynchronous payload signals together at a data rate higher than that of the asynchronous payload data rate;

generating stuff payload signals identified by random stuff patterns for the identification of the

stuffed payload signals among the synchronized payload frame groups;

distinguishing stuff payload signals from payload signals by the random stuff patterns through a first finite state machine configured in a memory device, the memory device storing state transition tables;

processing the synchronized payload signals identified by the finite state machine with a signal processing algorithm;

distinguishing stuff payload signals from payload signals by the random stuff patterns through a second finite state machine configured in a memory device, the memory device storing state transition tables;

restoring the processed payload signals identified by the second finite state machine to their asynchronous relationships, whereby processed asynchronous payload signals are provided;

multiplexing the restored asynchronous payload signals into a second telecommunication signal; and

transmitting the second telecommunication signal to a destination.

10. A device for processing a telecommunication signal on a telecommunications network, comprising:

a first interface for receiving a synchronous telecommunication signal containing multiplexed, asynchronous payload signals each having a data rate;

an extraction circuit for separating the asynchronous payload signals from the synchronous telecommunication signals received though the first interface;

a framing circuit for sequentially framing the asynchronous payload signals extracted by the extraction circuit with a corresponding clock pulse and framing pulse;

a synchronization circuit for synchronizing the sequentially framed asynchronous payload signals passed from said framing circuit together at a data rate higher than that of the asynchronous payload data rate;

at least one data processor for processing the synchronized payload signals of the synchronization stage with a signal processing algorithm at the data rate of said synchronization stage;

a reassembly circuit for restoring the processed payload signals to their asynchronous relationships at a rate equal to said data rate of the synchronization stage, whereby processed asynchronous payload signals are provided; and

a multiplexer for multiplexing the restored asynchronous payload signals of the reassembly stage into a second telecommunication signal for retransmission of the resulting telecommunication signal through said first interface to a destination.

11. A device for processing a telecommunication signal on a telecommunications network, comprising:

a first interface for receiving a synchronous telecommunication signal containing multiplexed, asynchronous payload signals each having a data rate;

an extraction circuit for separating the asynchronous payload signals from the synchronous telecommunication signals received though the first interface;

a framing circuit for sequentially framing the asynchronous payload signals extracted by the extraction circuit with a corresponding clock pulse and framing pulse;

a synchronization circuit for synchronizing the sequentially framed asynchronous payload signals passed from said framing circuit together at a data

rate higher than that of the asynchronous payload data rate;

a stuff frame generator for generating stuffed payload signals among synchronized payload frames, the stuffed signals being characterized by random stuff patterns for the identification of the stuffed payload signals among the synchronized payload frame groups;

a finite state machine configured in a memory device for distinguishing stuffed payload signals from payload signals based on state transition tables stored in the memory device;

at least one data processor for processing the synchronized payload signals identified by the finite state machine with a signal processing algorithm at the data rate of said synchronization stage;

a reassembly circuit for restoring the processed payload signals to their asynchronous relationships at a rate equal to said data rate of the synchronization stage, whereby processed asynchronous payload signals are provided;

a multiplexer for multiplexing the restored asynchronous payload signals of the reassembly stage into a second telecommunication signal for retransmission of the resulting telecommunication signal through said interface to a destination.

12. A device for processing a telecommunication signal on a telecommunications network, comprising:

a first interface for receiving a synchronous telecommunication signal containing multiplexed, asynchronous payload signals each having a data rate;

an extraction circuit for separating the asynchronous payload signals from the synchronous telecommunication signals received though the first interface;

a framing circuit for sequentially framing the asynchronous payload signals extracted by the

extraction circuit with a corresponding clock pulse and framing pulse;

a synchronization circuit for synchronizing the sequentially framed asynchronous payload signals passed from said framing circuit together at a data rate higher than that of the asynchronous payload data rate;

a stuff frame generator for generating stuffed payload signals among synchronized payload frames, the stuffed signals being characterized by random stuff patterns for the identification of the stuffed payload signals among the synchronized payload frame groups;

a first finite state machine configured in a memory device for distinguishing stuffed payload signals from payload signals by the random stuff patterns, the memory device storing state transition tables;

at least one data processor for processing the synchronized payload signals identified by the finite state machine with a signal processing algorithm at the data rate of said synchronization stage;

a second finite state machine configured in a memory device for distinguishing stuffed payload signals from payload signals based on state transition tables stores in the memory device;

a reassembly circuit for restoring the processed payload signals identified by said second finite state machine to their asynchronous relationships at a rate equal to said data rate of the synchronization stage, whereby processed asynchronous payload signals are provided;

a multiplexer for multiplexing the restored asynchronous payload signals of the reassembly stage into a second telecommunication signal for retransmission of the resulting telecommunication signal through said interface to a destination.